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Jeffrey C. Hood
Meyertons, Hood, Kivlin, Kowert & Goetzel PC
P.O. Box 398
Austin, TX 78767

EXAMINER

MALEK, LEILA

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/621,293

Applicant(s)

GARMANY, ET AL.

Examiner

Leila Malek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39, 43 and 49-56 is/are rejected.
- 7) ☒ Claim(s) 40-42 and 44-48 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/17/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>05/18/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 05/18/2004 has been considered and made of record by the examiner.

Claim Objections

3. Claims 1, 11, 18, 19, and 45-51 are objected to because of the following informalities: As to claims 1, 11, 18, 19, 45 and 49-51 "channel spectrum estimate is usable to compute" needs to be replaced by a positive recitation, e.g. channel spectrum estimate is used to compute. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-10, 12-15, 18-37, and 49-56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding the above claims applicant fails to disclose definitions for major and minor echoes in a way to enable one skilled in the art to

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distinguish between the two. Applicant also fails to disclose how the major echoes have been identified.

5. Claims 1-10, 12-15, 18-37, 49, and 50-56 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement.

The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Regarding the above claims applicant fails to disclose how the number of major and minor echoes have been counted in a way to enable one skilled in the art to use the same method.

6. Claim 29 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As to claim 29, applicant fails to disclose U and V in the specification.

7. Claim 3 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. As to claim 3, Applicant in the invention's disclosure describes (see page 18, lines 11 and 12) that the autocorrelation block 204 performs a frequency domain autocorrelation operation on the signal spectrum to obtain a power spectrum. Therefore, it is not clear

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how the filtered autocorrelation function is computed from the filtered power spectrum as cited in claim 3.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 51 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claim 51, applicant claims "a memory medium comprising program instructions", however there are no instructions given in the body of claim; therefore the claims is vague.

9. Claim 53 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As to claim 53, applicant fails to disclose (in the claim) what a termination condition is.

Claim Rejections - 35 USC § 101

10. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 38-44 are rejected under 35 U.S.C. 101 because: as to claim 38, the claimed invention is directed to non-statutory subject matter because as a whole it does not accomplish a practical application. In order to accomplish a practical application, it must produce a "useful, concrete and tangible result." (see MPEP 2106, under section II, Determine What Applicant Has Invented and is Seeking to Patent, subsection A,

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Identify and Understand Any Practical Application Asserted for the Invention.).

Applicant in claim 38, recites an algorithm, however there is no practical application disclosed for this algorithm (i.e. there is no use cited in the claim for performing the whole process, e.g. claim does not recite that the process has been used for echo canceling and so on).

Claim 51 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter, because as a whole it does not accomplish a practical application. In order to accomplish a practical application, it must produce a "useful, concrete and tangible result." (see MPEP 2106, under section II, Determine What Applicant Has Invented and is Seeking to Patent, subsection A, Identify and Understand Any Practical Application Asserted for the Invention.). Applicant in claim 51 recites "a memory medium comprising program instructions"; which is improper. Examiner suggests the use of "computer readable medium encoded with computer executable instructions".

Claims 52-56 are rejected under 35 U.S.C. 101 because: as to claims 52 and 54, the claimed invention is directed to non-statutory subject matter because as a whole it does not accomplish a practical application. In order to accomplish a practical application, it must produce a "useful, concrete and tangible result." (see MPEP 2106, under section II, Determine What Applicant Has Invented and is Seeking to Patent, subsection A, Identify and Understand Any Practical Application Asserted for the Invention.). Applicant in claim 52 and 54, recites an algorithm, however there is no practical application disclosed for this algorithm (i.e. there is no use cited in the body of

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claim for performing the whole process, e.g. Applicant does not cite that the process has been used for echo canceling and so on).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1- 4, 9, 11-13, 16, 17, and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Limberg et al. (hereafter, referred as Limberg) (US 2002/0051087) in view of Pham (US 2002/0191779).

As to claims 1, 50 and 51, Limberg discloses a method/apparatus comprising: receiving an input signal from a channel (see Fig. 5, block 31 and paragraph 0005), wherein the input signal includes one or more major echoes and one or more minor echoes (see paragraph 0004, since applicant fails to determine the difference between the major and minor echoes; therefore, "echoes" as described by Limberg are broadly interpreted as one or more major and minor echoes), wherein the one or more major echoes and one or more minor echoes are introduced by the channel; identifying the one or more major echoes present in the input signal (see paragraph 0072); identifying the one or more minor echoes from a filtered autocorrelation function of the input signal (see Fig. 6, block 52 and paragraph 0072); identifying the one or more minor echoes from a filtered power spectrum of the input signal (see Fig. 5, blocks 35 and 43 and paragraph 0059). Limberg discloses all the subject matters claimed in claims 1, 50, and

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51, except for computing a channel spectrum estimate from the one or more major echoes and the one or more minor echoes; wherein the channel spectrum estimate is usable to remove at least a portion of the one or more major echoes and the one or more minor echoes from the input signal. Pham, in the same field of endeavor discloses an echo cancellation method, wherein, the channel spectrum has been computed from the one of more major echoes and the one or more minor echoes (see paragraphs 0059 and 0075) (i.e. echoes with different amount of delay have been interpreted as major and minor echoes). Pham further discloses that the estimate is usable to remove at least a portion of the one or more major echoes and the one or more minor echoes from the input signal (see paragraphs 0069-0075). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Limberg as suggested by Pham to take advantage of a fast echo canceller (see paragraph 0007) and cancel almost all the echoes in the system and increase the performance of the receiver.

As to claim 2, Limberg further discloses performing a transform on the input signal to produce a spectral representation of the input signal (see paragraph 0058); Limberg discloses all the subject matters claimed in claimed 2, except that identifying the one or more major echoes and the operations of identifying the one or more minor echoes are performed using the spectral representation of the input signal. Pham further discloses that identifying the one or more major echoes and the operations of identifying the one or more minor echoes are performed using the spectral representation of the input signal (see Fig. 11 and paragraph 100). It would have been obvious to one of ordinary skill in the art at the time of invention to determine the

autocorrelation function of the input signal more accurately and therefore identify the echoes in the system more accurately and improve the echo cancellation process (see paragraph 190-192).

As to claim 3, Limberg discloses that the filtered power spectrum is computed from the spectral representation of the input signal (see paragraph 0058); wherein the autocorrelation block performs a frequency domain autocorrelation operation on the signal spectrum to obtain a power spectrum (see paragraph 0058) (the claim has been interpreted in the light of spec).

As to claim 4, Limber further discloses identifying the one or more major echoes comprises analyzing pulses in a signal representing a filtered cross-correlation between a training sequence and a window of the input signal (see paragraph 0068).

As to claim 9, Limberg further discloses that the channel is a wireless communication channel (see paragraph 0002).

As to claim 11, Limberg discloses a method comprising: receiving an input signal from a channel (see Fig. 5. block 31 and paragraph 0005), wherein the input signal includes one or more echoes introduced by the channel (see paragraph 0004, since applicant fails to determine the difference between the major and minor echoes; therefore, "echoes" as described by Limberg are broadly interpreted as one or more major and minor echoes); performing a transform on the input signal to produce a spectral representation of the input signal (see paragraph 0058). Limberg discloses all the subject matters claimed in claim 11, except for determining the one or more echoes based on the spectral representation of the input signal; computing a channel spectrum

estimate from the one or more echoes; wherein the channel spectrum estimate is usable to remove at least a portion of the one or more echoes from the input signal. Pham, in the same field of endeavor, discloses that identifying the one or more major echoes and the operations of identifying the one or more minor echoes are performed using the spectral representation of the input signal (see Fig. 11 and paragraph 100). It would have been obvious to one of ordinary skill in the art at the time of invention to determine the autocorrelation function of the input signal more accurately and therefore identify the echoes in the system more accurately and improve the echo cancellation process (see paragraph 190-192). Pham also discloses that the channel spectrum has been computed from the one of more major echoes and the one or more minor echoes (see paragraphs 0059 and 0075) (i.e. echoes with different amount of delay have been interpreted as major and minor echoes). Pham further discloses that the estimate is usable to remove at least a portion of the one or more major echoes and the one or more minor echoes from the input signal (see paragraphs 0069-0075). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Limberg as suggested by Pham to take advantage of a fast echo canceller (see paragraph 0007) and cancel almost all the echoes in the system and increase the performance of the receiver.

As to claim 12, Limberg further discloses determining one or more major echoes based on the spectral representation of the input signal and a spectral representation of a known training sequence (see paragraphs 0145); if there is only one major echo, determining the one or more minor echoes in a first manner based on the spectral

representation of the signal (see Fig. 6, block 52 and paragraph 0072); if there is more than one major echo, determining the one or more minor echoes in a second manner based on the spectral representation of the signal (see Fig. 5 blocks 35 and 43 and paragraph 0059).

As to claim 13, Limberg further discloses that determining the one or more minor echoes in a first manner comprises determining the one or more minor echoes using a filtered autocorrelation function of the input signal (see Fig. 6, block 52 and paragraph 0072); wherein determining the one or more minor echoes in a second manner comprises determining the one or more minor echoes using a filtered power spectrum of the input signal (see Fig. 5 blocks 35 and 43 and paragraph 0059).

As to claim 16, Limberg further discloses replacing (interpreted as adjusting) the input signal to remove at least a portion of the one or more echoes from the input signal based on the channel spectrum estimate (see paragraph 0055).

As to claim 17, Limberg discloses that the input signal is a digital television signal (see the abstract and paragraph 0002).

As to claim 49, Limberg discloses a signal receiver system for receiving an input signal from a channel (see Fig. 5, block 31 and paragraph 0005), wherein the input signal includes one or more major echoes and one or more minor echoes (see paragraph 0004, since applicant fails to determine the difference between the major and minor echoes; therefore, "echoes" as described by Limberg are broadly interpreted as one or more major and minor echoes), wherein the one or more major echoes and one or more minor echoes are introduced by the channel; identifying the one or more

major echoes present in the input signal (see paragraph 0072); identifying the one or more minor echoes from a filtered autocorrelation function of the input signal (see Fig. 6, block 52 and paragraph 0072); identifying the one or more minor echoes from a filtered power spectrum of the input signal (see Fig. 5, blocks 35 and 43 and paragraph 0059). Limberg is silent in disclosing that the apparatus comprising a memory configured to store program instructions and a processor configured to read and execute program instructions from the memory, wherein, in response to execution of the program instructions, the processor is operable to execute the above instructions, however inherently every communication system comprises a memory to store the program functions and a processor to read and execute program instructions from the memory. Limberg discloses all the subject matters claimed in claim 49, except for computing a channel spectrum estimate from the one or more major echoes and the one or more minor echoes; wherein the channel spectrum estimate is usable to remove at least a portion of the one or more major echoes and the one or more minor echoes from the input signal. Pham, in the same field of endeavor discloses an echo cancellation method, wherein, the channel spectrum has been computed from the one or more major echoes and the one or more minor echoes (see paragraphs 0059 and 0075) (i.e. echoes with different amount of delay have been interpreted as major and minor echoes). Pham further discloses that the estimate is usable to remove at least a portion of the one or more major echoes and the one or more minor echoes from the input signal (see paragraphs 0069-0075). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Limberg as suggested by

Pham to take advantage of a fast echo canceller (see paragraph 0007) and cancel almost all the echoes in the system and increase the performance of the receiver.

12. Claims 38 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chafee et al. (hereafter, referred as Chafee) (US 5,117,418), in view of Pham (US 2002/0191779).

As to claim 38, Chafee discloses a method for reducing echoes on a communication channel (see the abstract) comprising: (a) receiving a first stream of blocks of samples of an input signal (See Fig. 2); (b) computing a transform of each block of samples to generate a second stream of signal spectra (see column 5, lines 37-40); (c) performing a frequency-domain correlation operation on each signal spectrum of the second stream to obtain a third stream of power spectra (column 6, lines 39-56); (d) filtering the third stream of power spectra to obtain a fourth stream of filtered power spectra (see column 5, lines 66-68); (e) computing an analytic signal S_A by performing an inverse transform of a current one of the fourth stream of filtered power spectra over non-negative frequencies (see column 6, lines 1-3); (f) estimating complex coefficients for a set of echoes from an analysis of pulses in selected intervals of the analytic signal S_A , given a current estimate of delay times for the set of echoes (see column 6, lines 15-19); (g) generating a revised channel spectrum estimate from phase changes of the estimated complex coefficients and the current estimate of the delay times (see column 6, lines 15-19); (h) repeating (e), (f), and (g) (see column 4, lines 26-28); (i) updating the set of echoes including delay times in response to an update condition (see column 6, lines 15-19). Chafee discloses all the limitations in

claim 38, except for performing a frequency domain auto-correlation on each signal spectrum. Pham, in the same field of endeavor, discloses a method for canceling the echo in the communication systems. Pham further discloses that the auto-correlation function of output signal 18 in the frequency domain (see Fig. 11) has been obtained in order to extract the information regarding the channel and cancel the echoes in the system (see paragraph 0044). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Chaffee as suggested by Pham to use the auto-correlation function to extract the channel information (see paragraph 0044) and as the result suppress the echoes more efficiently.

As to claim 39, Chaffee discloses that the update condition is a condition indicating that one or more of the delay times of the set of echoes have detectably changed since a last update (see column 6, lines 15-19, column 7, last paragraph and column 8, first paragraph).

13. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chaffee and Pham, further in view of Applicant's admitted prior art (background of invention).

As to claim 43, Pham discloses that filtering comprises performing an FIR filtration on the third stream of power spectra to obtain the fourth stream of filtered power spectra (see paragraph 0069). Neither Pham nor Chaffee disclose that there could be an IIR filter used instead of the FIR filter. Applicant in the background of invention discloses (see page 3, last paragraph) that in noise cancellers an IIR filter can be used instead of the FIR filter. It would have been obvious to one of ordinary skill in the art at the time of invention to modify Pham and Chaffee to use an IIR filter to

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cancel the longer delayed echoes in the system (as suggested by the Applicant's admitted prior art).

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Limberg and Pham, further in view of Applicant's admitted prior art (background of invention).

As to claim 10, Limberg and Pham disclose all the subject matters claimed in claim 1, except that the channel is a wired communication channel. Applicant in the background of invention (see page 1, lines 29-31) discloses that in certain wired transmission systems, multipath reflections can also occur. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use an echo canceller (such as the one described by Pham or Limberg) in a wired communication system to more accurately cancel the echo in the system.

Allowable Subject Matter

15. Claims 40-42, 44 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. Claims 45-48 would be allowable if rewritten in a way to overcome the objections cited in this office action.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (US 5,172,232).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER